Complete Summary

GUIDELINE TITLE

Follow-up of renal cell carcinoma.

BIBLIOGRAPHIC SOURCE(S)

Casalino DD, Choyke PL, Bluth EI, Bush WH Jr, Francis IR, Jafri SZ, Kawashima A, Kronthal A, Older RA, Papanicolaou N, Ramchandani P, Rosenfield AT, Sandler CM, Segal AJ, Tempany C, Resnick MI, Expert Panel on Urologic Imaging. Follow-up of renal cell carcinoma. [online publication]. Reston (VA): American College of Radiology (ACR); 2005. 4 p. [44 references]

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: Newhouse JH, Amis ES Jr, Bigongiari LR, Bluth EI, Bush WH Jr, Choyke PL, Fritzsche PJ, Holder LE, Sandler CM, Segal AJ, Resnick MI, Rutsky EA. Follow-up of renal cell carcinoma. American College of Radiology. ACR Appropriateness Criteria. Radiology. 2000 Jun;215 Suppl:761-4.

The appropriateness criteria are reviewed annually and updated by the panels as needed, depending on introduction of new and highly significant scientific evidence.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Renal cell carcinoma

GUIDELINE CATEGORY

Evaluation

CLINICAL SPECIALTY

Nephrology
Nuclear Medicine
Oncology
Pulmonary Medicine
Radiology
Surgery

INTENDED USERS

Health Plans
Hospitals
Managed Care Organizations
Physicians
Utilization Management

GUIDELINE OBJECTIVE(S)

To evaluate the appropriateness of follow-up radiologic examinations for patients with renal cell carcinoma

TARGET POPULATION

Patients with renal cell carcinoma

INTERVENTIONS AND PRACTICES CONSIDERED

1. X-ray
    - Chest
    - Kidney, intravenous urography (IVU)
    - Abdomen, kidneys-ureters-bladder (KUB)
    - Bone, metastatic survey
2. Computed tomography (CT)
    - Abdomen and pelvis
    - Chest
    - Head
3. Magnetic resonance imaging (MRI)
    - Abdomen and pelvis
    - Head
4. Fluorodeoxyglucose positron emission tomography (FDG-PET), kidney
5. Ultrasound (US), kidney, transabdominal view
6. Nuclear medicine (NUC), bone scan

MAJOR OUTCOMES CONSIDERED

Utility of radiologic examination in follow-up of patients with renal cell carcinoma

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The guideline developer performed literature searches of peer-reviewed medical journals, and the major applicable articles were identified and collected.

NUMBER OF SOURCE DOCUMENTS

The total number of source documents identified as the result of the literature search is not known.

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Not Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not stated

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

One or two topic leaders within a panel assume the responsibility of developing an evidence table for each clinical condition, based on analysis of the current literature. These tables serve as a basis for developing a narrative specific to each clinical condition.

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus (Delphi)

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Since data available from existing scientific studies are usually insufficient for meta-analysis, broad-based consensus techniques are needed for reaching agreement in the formulation of the appropriateness criteria. The American College of Radiology (ACR) Appropriateness Criteria panels use a modified Delphi technique to arrive at consensus. Serial surveys are conducted by distributing questionnaires to consolidate expert opinions within each panel. These questionnaires are distributed to the participants along with the evidence table

and narrative as developed by the topic leader(s). Questionnaires are completed by the participants in their own professional setting without influence of the other members. Voting is conducted using a scoring system from 1 to 9, indicating the least to the most appropriate imaging examination or therapeutic procedure. The survey results are collected, tabulated in anonymous fashion, and redistributed after each round. A maximum of three rounds is conducted and opinions are unified to the highest degree possible. Eighty percent agreement is considered a consensus. This modified Delphi technique enables individual, unbiased expression, is economical, easy to understand, and relatively simple to conduct.

If consensus cannot be reached by this Delphi technique, the panel is convened and group consensus techniques are utilized. The strengths and weaknesses of each test or procedure are discussed and consensus reached whenever possible. If "No consensus" appears in the rating column, reasons for this decision are added to the comment sections.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Criteria developed by the Expert Panels are reviewed by the American College of Radiology (ACR) Committee on Appropriateness Criteria.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

ACR Appropriateness Criteria®

Clinical Condition: Follow-up of Renal Cell Carcinoma

Variant: Asymptomatic patient; no known metastases

Radiologic Exam Procedure	Appropriateness Rating	Comments
X-ray, chest	8	Not necessary if CT performed
CT, abdomen and	8	Particularly if primary was high stage

Radiologic Exam Procedure	Appropriateness Rating	Comments
pelvis		and/or high grade
CT, chest	6	
MRI, abdomen and pelvis	6	
FDG PET, kidney	4	
US, kidney, transabdominal	3	
NUC, bone scan	2	
X-ray, kidney, intravenous urography, IVP	2	
CT, head	1	
X-ray, abdomen, KUB	1	
X-ray, bone, metastatic survey	1	
MRI, head	1	
Appropriateness Criteria Scale 1 2 3 4 5 6 7 8 9 1 = Least appropriate 9 = Most appropriate		

Note: Abbreviations used in the table are listed at the end of the "Major Recommendations" field.

This narrative addresses appropriate imaging examinations to follow patients who have been treated for renal cell carcinoma by radical nephrectomy or nephron-sparing surgery. It specifically deals with asymptomatic patients; it does not deal with imaging of nononcologic complications of surgery; with patients undergoing systemic therapy for known recurrent renal cell carcinoma; with patients in whom specific symptoms, signs, or laboratory studies suggest recurrent malignancy at a specific site; or with patients whose surgery is known to have left residual tumor.

Follow-up is important for patients who have had radical or partial nephrectomy for renal cell carcinoma. Although they may be thought to have been initially cured, local or metastatic recurrences may develop in 20 to 50% of patients and require management. Solitary metastases may occasionally be treated by resection. Although chemotherapy has largely been found to be ineffective, immunotherapy may benefit certain subgroups of patients. And regardless of availability of effective treatment for recurrent disease, both patients and their physicians usually find it desirable to be able to estimate prognosis by evaluating recurrences.

The anatomic location of recurrences clearly dictates the choice of imaging modalities. The tumor may recur in the resection site, especially if the primary is large, high grade, or has a higher tumor (T) stage. The incidence of tumor recurrence in the resection site is similar or only slightly higher in patients who had partial nephrectomy compared to those who had radical nephrectomy. More commonly, however, the tumor appears as distant metastases. Several studies have suggested surveillance protocols based on patterns of tumor recurrence, including where and when metastases occur, and pathological stage at the time of resection. For instance, the risk of metastatic disease after nephrectomy increases with higher stage of the primary tumor. In decreasing order of frequency, metastases most commonly appear in lung (with or without mediastinal or hilar nodes), bone, the upper abdomen (including the resection bed, adrenal, contralateral kidney, liver), brain, and a multitude of other sites (including skin, spleen, heart, diaphragm, gut, connective tissue).

Other characteristics of metastatic disease from renal cell carcinoma are worth consideration. Most lung metastases are (at least early in their history) asymptomatic. Metastases in thoracic nodes usually indicate a very short survival. Most bone metastases are symptomatic at the time of discovery; they can appear anywhere in the skeleton, but frequently appear in the lumbar spine, thoracic spine, and ribs--that is, the areas likely to be included in chest and abdomen examination. Most recurrences appear within 3 years after the initial resection, but they may not occur until decades later. Tumor recurrences tend to occur earlier in patients with higher tumor (T) stages, and those that appear after a long interval appear to be associated with a better prognosis. Therefore it may be argued either that routine follow-up be continued for only a few years (especially if the chosen modalities are expensive), or that to halt follow-up after a brief period may deprive the group of patients who might benefit most from treating recurrences the advantage of an early diagnosis.

Pulmonary Metastases

Given the fact that pulmonary metastases are often asymptomatic, routine imaging of the chest is usually performed. The major modalities used to search for metastases in the chest are the chest x-ray and chest CT; certainly, if the chest x-ray is chosen and is positive, CT almost inevitably follows in order to plan for and monitor the results of further therapy. The chest x-ray is certainly less expensive, and less likely to display incidental findings unrelated to metastatic disease. CT is more likely to display metastases earlier (in particular, it is more likely to demonstrate metastatic disease when there is just one lesion that might be amenable to resection than when there are several) and is probably more sensitive than chest x-ray in detecting metastases in thoracic spine, ribs, bones of the shoulder, and nodes. But CT is also more likely to display small granulomas that may masquerade as metastases and require further work-up. The excess yield from chest CT over chest radiography is probably too small to warrant its use in routine surveillance. While a few studies have shown FDG PET to be highly specific in detecting chest metastases, the sensitivity is limited. No role for MRI, angiography, or US has been claimed in screening for metastases to the chest.

Abdominal Recurrences

Abdominal recurrences may occur at the surgical site or metastatic to the liver, lymph nodes, adrenal gland, bones, etc. While a few studies have argued against routine imaging of the abdomen in patients after resection of low-stage tumors (T1 and certain T2 tumors) abdominal surveillance is commonly performed with CT. CT is quite sensitive in detecting metastases in the resection site, contralateral kidney, adrenal glands, liver, and bones included in the examination, MRI should be considered in place of CT in younger patients who will likely require multiple scans and in patients with renal dysfunction or a history of an allergy to iodinated contrast. Plain radiography is likely to be insensitive for all but the largest of masses and bone metastases. FDG PET can be a useful adjunct to CT or MRI, particularly when a local recurrence is suspected in a renal fossa that may have postoperative and postradiation changes. Performing separate nuclear medicine liver-spleen, bone, and renal scans is not practical. Angiography is too invasive. Urography is likely to be less sensitive than CT; it may be falsely negative in patients with small intrarenal masses and it is likely to miss all but the largest extrarenal masses. Ultrasound has had some demonstrated success in detecting intra-abdominal recurrences, but it has never been shown to be as sensitive as CT, and is likely to be less sensitive in detecting small resection bed metastases, especially if the nephrectomy has been performed on the left side and if loops of gut occupy the surgical site.

Osseous Metastases

Surveillance for the appearance of metastases to the skeleton might be done by serial radionuclide bone scans or by no examination at all unless the patient develops specific symptoms. Most authors do not suggest routine bone scanning to search for metastases without symptoms, because the vast majority of bone metastases are symptomatic and bone metastases are not curable. When a bone metastasis is suspected, a bone scan is preferable to MRI or CT because it can survey the entire skeleton. If the bone scan is positive, a radiograph might be considered to exclude pending fracture. Identification of bone metastases may facilitate treatment for pain relief and prevention of pathologic fracture. Relatively little has been written regarding the use of radiography or scintigraphy to monitor patients in the postoperative phase; some data from studies that have evaluated patients for staging purposes at the time of diagnosis may be useful.

While FDG PET may reveal bone metastases not detected on bone scan, false negative results have also been reported.

Brain Metastases

There has been no literature that supports employing routine imaging of the brain to search for metastases from renal cell carcinoma in asymptomatic patients.

Summary

Tumor recurrences, whether metastatic or local, are not uncommon after resection of localized renal cell carcinoma. The intensity of follow-up in these patients is largely dependent on the stage of the primary tumor and generally includes a history and physical examination, complete blood count (CBC), liver function tests (LFTs), and chest radiography. While there is no clear consensus regarding the inclusion and timing of abdominal CT in routine surveillance,

abdominal CT is generally included in the follow-up evaluation of patients with higher tumor (T) stages. The literature does not support the routine use of bone scans or brain CTs in asymptomatic patients. FDG-PET appears to be a useful adjunct to conventional imaging.

Abbreviations

- CT, computed tomography
- FDG PET, fluorodeoxyglucose positron emission tomography
- IVP, intravenous pyelography
- IVU, intravenous urography
- KUB, kidneys, ureters, bladder
- MRI, magnetic resonance imaging
- NUC, nuclear medicine
- US, ultrasound

CLINICAL ALGORITHM(S)

Algorithms were not developed from criteria guidelines.

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The recommendations are based on analysis of the current literature and expert panel consensus.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Selection of appropriate radiologic imaging procedures for evaluation of patients with renal cell carcinoma

POTENTIAL HARMS

- Urography is likely to be less sensitive than computed tomography (CT) in the evaluation of abdominal recurrences; it may be falsely negative in patients with small intrarenal masses, and it is likely to miss all but the largest extrarenal masses
- Ultrasound has never been shown to be as sensitive as CT in detecting intra-abdominal recurrences, and is likely to be less sensitive in detecting small resection bed metastases, especially if the nephrectomy has been performed on the left side and if loops of gut occupy the surgical site.
- While fluorodeoxyglucose positron emission tomography (FDG PET) may reveal bone metastases not detected on bone scan, false negative results have also been reported

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

An American College of Radiology (ACR) Committee on Appropriateness Criteria and its expert panels have developed criteria for determining appropriate imaging examinations for diagnosis and treatment of specified medical condition(s). These criteria are intended to guide radiologist, radiation oncologist, and referring physicians in making decisions regarding radiologic imaging and treatment. Generally, the complexity and severity of a patient's clinical condition should dictate the selection of appropriate imaging procedures or treatments. Only those exams generally used for evaluation of the patient's condition are ranked. Other imaging studies necessary to evaluate other co-existent diseases or other medical consequences of this condition are not considered in this document. The availability of equipment or personnel may influence the selection of appropriate imaging procedures or treatments. Imaging techniques classified as investigational by the U.S. Food and Drug Administration (FDA) have not been considered in developing these criteria; however, study of new equipment and applications should be encouraged. The ultimate decision regarding the appropriateness of any specific radiologic examination or treatment must be made by the referring physician and radiologist in light of all the circumstances presented in an individual examination.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

IMPLEMENTATION TOOLS

Personal Digital Assistant (PDA) Downloads

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Living with Illness

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Casalino DD, Choyke PL, Bluth EI, Bush WH Jr, Francis IR, Jafri SZ, Kawashima A, Kronthal A, Older RA, Papanicolaou N, Ramchandani P, Rosenfield AT, Sandler CM, Segal AJ, Tempany C, Resnick MI, Expert Panel on Urologic Imaging. Follow-up of renal cell carcinoma. [online publication]. Reston (VA): American College of Radiology (ACR); 2005. 4 p. [44 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

1996 (revised 2005)

GUIDELINE DEVELOPER(S)

American College of Radiology - Medical Specialty Society

SOURCE(S) OF FUNDING

American College of Radiology (ACR) provided the funding and the resources for these ACR Appropriateness Criteria®.

GUIDELINE COMMITTEE

Committee on Appropriateness Criteria, Expert Panel on Urologic Imaging

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Panel Members: David D. Casalino, MD (Principal Author); Peter L. Choyke, MD (Panel Chair); Edward Bluth, MD; William H. Bush, Jr, MD; Isaac R. Francis, MD; S. Zafar H. Jafri, MD; Akira Kawashima, MD, PhD; Alan Kronthal, MD; Robert A. Older, MD; Nicholas Papanicolaou, MD; Parvati Ramchandani, MD; Arthur T. Rosenfield, MD Carl Sandler, MD; Arthur J. Segal, MD; Clare Tempany, MD; Martin I. Resnick, MD

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

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The appropriateness criteria are reviewed annually and updated by the panels as needed, depending on introduction of new and highly significant scientific evidence.

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the American College of Radiology (ACR) Web site.

ACR Appropriateness Criteria® Anytime, Anywhere™ (PDA application). Available from the ACR Web site.

Print copies: Available from the American College of Radiology, 1891 Preston White Drive, Reston, VA 20191. Telephone: (703) 648-8900.

AVAILABILITY OF COMPANION DOCUMENTS

The following is available:

- ACR Appropriateness Criteria®. Background and development. Reston (VA): American College of Radiology; 2 p. Electronic copies: Available in Portable Document Format (PDF) from the American College of Radiology (ACR) Web site.

PATIENT RESOURCES

None available

NGC STATUS

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